Department of Energy & Climate Change

DECC ENERGY MODELLING

International Exergy Economics Workshop

University of Sussex

13 – 15 July 2016

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Energy & Emissions Projections Team

Department of Energy & Climate Change

Overview

- **Energy demand model and projections**
- **Energy and emissions projections publication**
- **Possible areas for future development**
- **Working with DECC**

DECC (final) energy demand projections

- **What**
  - In-house econometric partial equilibrium model
  - Separate equations by sector & fuel
  - Covers whole UK energy market
  - No rigorous consideration of exergy
  - No cost estimates

- **How & when**
  - Re-estimation of equations every 2-3 years (winter)
  - Fundamental approach has not changed much
  - Model runs: 3-4 per year (mainly Summer)
  - Co-ordinated with inputs (Spring)

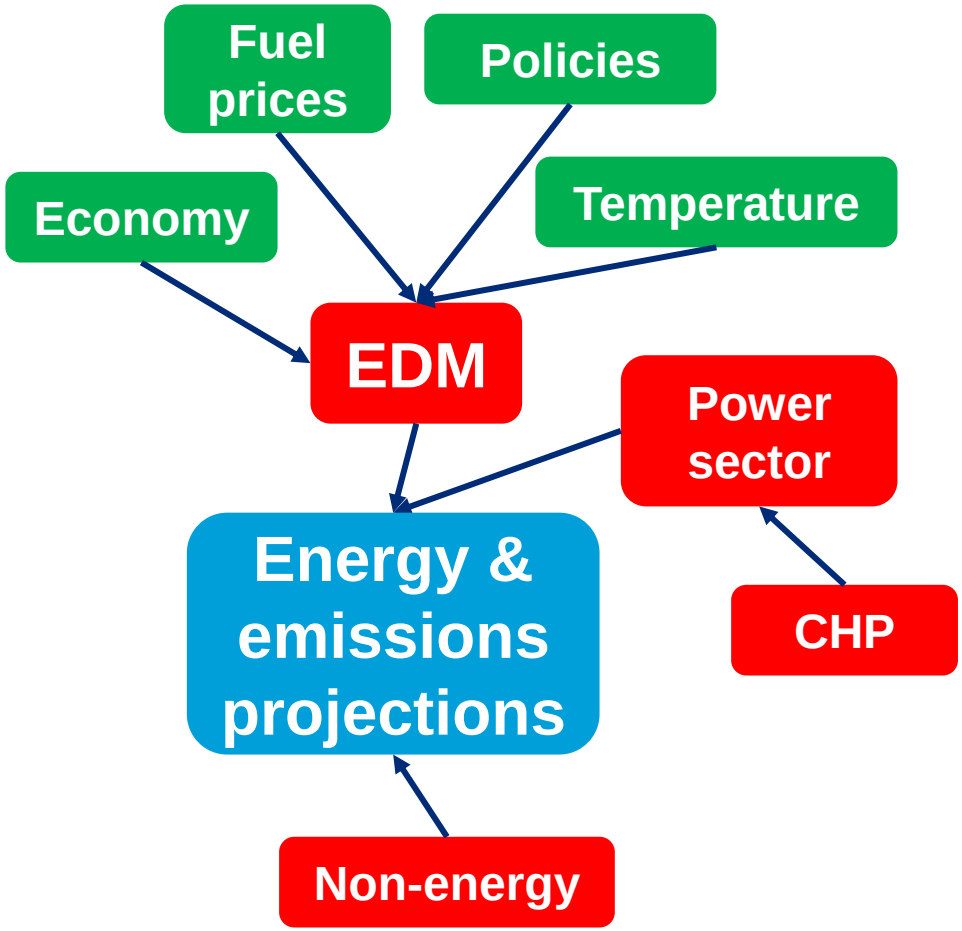
Energy and emissions projections

Department of Energy & Climate Change

Updated energy and emissions projections 2015

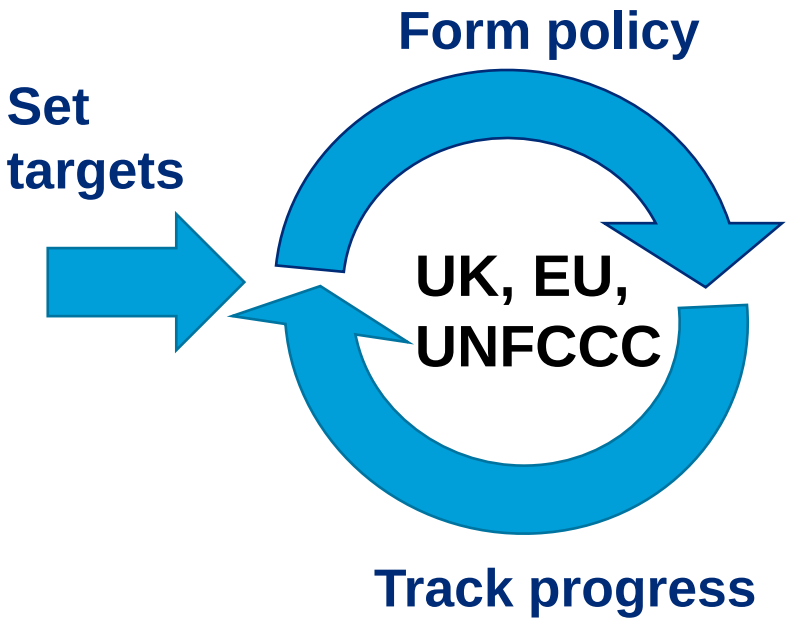
- Final demand
- Primary demand
- GHG emissions
- Policy savings
- Generators' capacities & sources

November 2015

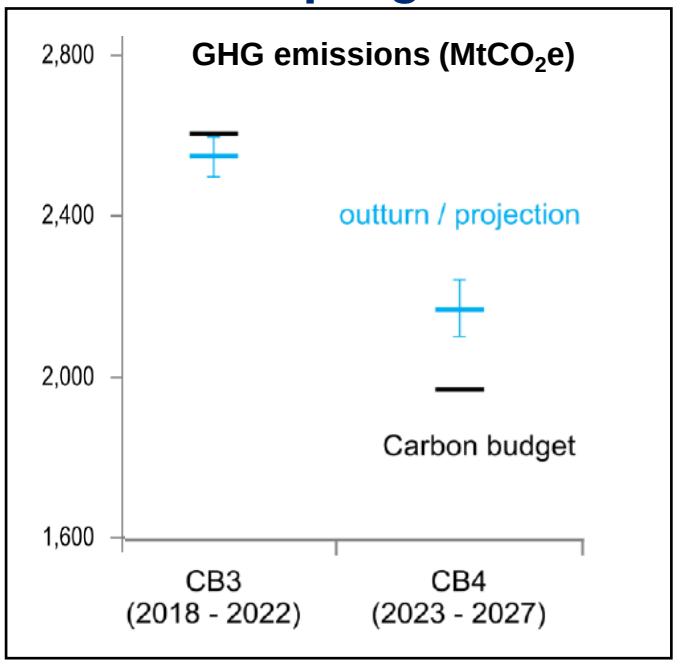


Energy and emissions projections

- **Purpose #1: progress tracking (annual)**



Latest progress



Energy and emissions projections

- **Purpose #2: informing long-term strategy**
  - Many and varied uses – **a very influential model!**

LCPD & IED

ETS

Climate Change Programme (2000)

LCTP (2009)

GOV.UK

Fiscal policy

Energy white paper (2007)

Forthcoming emissions reduction plan

Committee on Climate Change

Setting Carbon Budgets

Energy and emissions projections

- **Purpose #3: exploratory analysis**
  - Future **decoupling** of energy consumption from GDP?
  - Disruptive effect of technical **innovation** on future energy consumption?
  - ….. New analysis of **exergy**?

  - **Scenario testing**

- **Next steps:**
  - We want to hear your ideas for developing our energy demand modelling
  - Including least-cost optimisation modelling (see additional slides)

Working with DECC

- **Principles of DECC procurement:**
  - Get most value from public money
  - Transparent and fair
  - Competitive tendering process
  - Contracts +£10k on gov.uk Contracts Finder
  - For guidance, search: "procurement at DECC"
  - Strong emphasis on quality assurance (search : quality assurance in DECC)
  - "Develop suppliers so they are able to respond to our requirements"

Thank you for listening

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Additional slides

Other DECC energy models: UK TIMES

- **What**
  - Least cost optimization model for whole UK energy system (2010-2060)
  - Developed by IEA's Energy Technology Systems Analysis Program
  - Extended by UCL and modified by DECC
- **Tries to answer:** "what" & "when"
- **Given:**
  - Future (assumed) energy demand must be met
  - Must be done at the lowest possible cost
  - Technology constraints have to be respected, e.g. build rates
  - Perfect knowledge of the future energy system

Other DECC energy models: UK TIMES

- **Questions for future development**
  - How to get endogenous learning into a linear optimisation model?
  - How to factor risk aversion into the perfect-foresight optimisation model runs? At the moment the model will delay action for as long as it can, as it knows that it can get a technology at a certain point in time and all of the assumptions will come true. (e.g. using an adapted optimisation function based on lots of Monte Carlo type runs based on probability distributions of key parameters)
  - How to best model behavioural issues / barriers in a long-run optimisation model?